Sorensen

# DLM 600W Series
# Power Supplies

## M51A Option: Isolated Analog
## Programming Manual

**Sorensen Power Supplies**
**Elgar Electronics Corporation**
**9250 Brown Deer Road**
**San Diego, CA 92121-2294**
**1-800-73ELGAR (1-800-733-5427)**
**Tel: (858) 450-0085**
**Fax: (858) 458-0267**
**Email: sales@elgar.com**
**www.elgar.com**



August 21, 2002 Document No. M362299-01 Rev A

# SAFETY NOTICE

Before applying power to the system, verify that the instrument is configured properly for the user's particular application.

WARNING!

***Hazardous voltages may be present when covers are removed. Qualified personnel must use extreme caution when servicing this equipment. Circuit boards, test points, and output voltages also may be floating with respect to chassis ground.***

Installation and servicing must be performed by qualified personnel who are aware of dealing properly with attendant hazards. This includes such simple tasks as fuse verification.

**Ensure that the AC power line ground is connected properly to the chassis.** Similarly, other power ground lines including those to application and maintenance equipment must be grounded properly for both personnel and equipment safety.

Always ensure that facility AC input power is de-energized prior to connecting or disconnecting any cable.

In normal operation, the operator does not have access to hazardous voltages within the chassis. However, depending on the user's application configuration, **HIGH VOLTAGES HAZARDOUS TO HUMAN SAFETY** may be normally generated on the output terminals. The customer/user must ensure that the output power lines are labeled properly as to the safety hazards and that any inadvertent contact with hazardous voltages is eliminated.

Guard against risks of electrical shock during open cover checks by not touching any portion of the electrical circuits. Even when power is off, capacitors may retain an electrical charge. Use safety glasses during open cover checks to avoid personal injury by any sudden component failure.

Some circuits are live even with the front panel switch turned off. Service, fuse verification, and connection of wiring to the chassis must be accomplished at least five minutes after power has been removed via external means; all circuits and/or terminals to be touched must be safety grounded to the chassis.

These operating instructions form an integral part of the equipment and must be available to the operating personnel at all times. All the safety instructions and advice notes are to be followed.

Neither Elgar Electronics Corporation, San Diego, California, USA, nor any of the subsidiary sales organizations can accept any responsibility for incidental or consequential injury of personnel, or loss or damage of equipment or material that results from improper use of the equipment and accessories.

## SAFETY SYMBOLS

| | |
|---|---|
| CAUTION<br>Risk of Electrical Shock | CAUTION<br>Refer to Accompanying Documents |
| Off (Supply) | Direct Current (DC) |
| Standby (Supply) | Alternating Current (AC) |
| On (Supply) | 3~ Three–Phase Alternating Current |
| Protective Conductor Terminal | Earth (Ground) Terminal |
| Fuse | Chassis Ground |

# ELGAR FIVE–YEAR WARRANTY

Elgar Electronics Corporation (hereinafter referred to as Elgar) warrants its products to be free from defects in material and workmanship. This warranty is effective for one year from the date of shipment of the product to the original purchaser. Liability of Elgar under this warranty shall exist provided that:

- the Buyer exposes the product to normal use and service and provides normal maintenance on the product;
- Elgar is promptly notified of defects by the Buyer and that notification occurs within the warranty period;
- the Buyer receives a Return Material Authorization (RMA) number from Elgar's Repair Department prior to the return of the product to Elgar for repair, phone 800-73-ELGAR (800-733-5427), ext. 2295;
- the Buyer returns the defective product in the original, or equivalent, shipping container;
- if, upon examination of such product by Elgar it is disclosed that, in fact, a defect in materials and/or workmanship does exist, that the defect in the product was not caused by improper conditions, misuse, or negligence; and,
- that Elgar QA seal and nameplates have not been altered or removed and the equipment has not been repaired or modified by anyone other than Elgar authorized personnel.

This warranty is exclusive and in lieu of all other warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness of the product to a particular purpose. Elgar, its agents, or representatives shall in no circumstance be liable for any direct, indirect, special, penal, or consequential loss or damage of any nature resulting from the malfunction of the product. Remedies under this warranty are expressly limited to repair or replacement of the product.

## CONDITIONS OF WARRANTY

- To return a defective product, contact an Elgar representative or the Elgar factory for an RMA number. Unauthorized returns will not be accepted and will be returned at the shipper's expense.
- For Elgar products found to be defective within thirty days of receipt by the original purchaser, Elgar will absorb all ground freight charges for the repair. Products found defective within the warranty period, but beyond the initial thirty-day period, should be returned prepaid to Elgar for repair. Elgar will repair the unit and return it by ground freight pre-paid.
- Normal warranty service is performed at Elgar during the weekday hours of 7:30 am to 4:30 pm Pacific time. Warranty repair work requested to be accomplished outside of normal working hours will be subject to Elgar non-warranty service rates.
- Warranty field service is available on an emergency basis. Travel expenses (travel time, per diem expense, and related air fare) are the responsibility of the Buyer. A Buyer purchase order is required by Elgar prior to scheduling.
- A returned product found, upon inspection by Elgar, to be in specification is subject to an inspection fee and applicable freight charges.
- Equipment purchased in the United States carries only a United States warranty for which repair must be accomplished at the Elgar factory.

Sorensen

***Committed to Quality...Striving for Excellence***

This page intentionally left blank.

# CONTENTS

## LIST OF TABLES



## LIST OF FIGURES

# SECTION 1
# M51A OPTION OVERVIEW

## 1.1 Introduction

This addendum is to be used in conjunction with the *DLM 600W Series Power Supplies Operation Manual,* Sorensen Document No. M362161-01.

The Sorensen M51A Option for the DLM 600W Series power supplies provides a remote analog interface, which has safety isolation from the output terminals. This allows the remote analog interface to be connected to user accessible (SELV) control circuits, even though the output terminals were floated at a high potential with respect to the chassis.

## 1.2 General Description

The M51A Option provides isolation for all programming, monitoring, and digital I/O signals that are available through the remote analog interface. This isolation barrier eliminates the connection that exists in the standard DLM models between the non-isolated remote interface circuits and the output return (negative) terminal. The M51A Option remote analog signals are referenced to chassis, and could be user accessible irrespective of the float potentials that exist at the output terminals.

The M51A Option provides a full complement of programming, monitoring, and control methods. Remote programming is available for output voltage, current, and overvoltage protection (OVP). Analog output monitor signals are available for the output voltage and current. Digital I/O signals provide indication of the operational state, and a means of enabling the remote interface and the output.

The type and range of the control and monitor signals are user-selectable with a rear panel setup switch. The output voltage, current, and OVP could be programmed with a 0-5VDC, 0-10VDC, or 0-5kΩ resistance; in addition, the output voltage and current could be programmed with 4-20mA signals. The output voltage and current monitors could produce 0-5VDC, 0-10VDC, or 4-20mA signals. Isolated 1mA current sources are provided to facilitate the utilization of 0-5kΩ programming resistances.

Except for the isolated remote analog interface, the installation and operation of the DLM 600W Series power supplies remains as presented in the Operation Manual. The following sections provide a detailed description of the new features and the differences in operation.

# 1.3 Specifications

## 1.3.1 Electrical Specifications

**Remote Voltage Programming Accuracy, 0-5/10V Inputs:**

Output Voltage: 0.5% of Vmax
Output Current: 0.75% of Imax
OVP: 1.0% of 1.1 X Vmax

**Remote 4-20mA Programming Accuracy:**

Output Voltage: 0.75% of Vmax
Output Current: 1.0% of Imax

## 1.3.2 Supplemental Characteristics

**Remote Resistance Programming Accuracy, 0-5kΩ Input:**

Output Voltage: 1.0% of Vmax
Output Current: 1.5% of Imax
OVP: 1.5% of 1.1 X Vmax

**Remote Monitor Accuracy:**

Output Voltage, 0-5/10V ranges: 0.5% of Vmax
Output Voltage, 4-20mA: 0.75% of Vmax
Output Current, 0-5/10V ranges: 0.75% of Imax
Output Current, 4-20mA: 1.0% of Imax

SECTION 2
# ISOLATED REMOTE ANALOG INTERFACE OPERATION

## 2.1 INTFC SETUP Switch

The INTFC SETUP (Interface Setup) switch is accessible from the rear panel of the unit. It provides user selectability of the programming/monitoring ranges and signal types, as well as configuring the power supply for operation under remote control. Setting a switch to the UP position enables a function. The factory default settings are all switch positions OFF (down).

See Figure 2–1 for a rear panel view of low-voltage models DLM5–75M51A, DLM 8–75M51A, DLM 20–30M51A, DLM 40–15M51A, and DLM 60–10M51A. Refer to Figure 2–2 for a rear panel view of high-voltage models DLM 80–7.5M51A, DLM 150–4M51A, and DLM 300–2M51A.

| Switch Position | Function | OFF (Down) Position | ON (Up) Position |
|---|---|---|---|
| 1 | V, 10V or 4-20mA Select | 0-5VDC | 0-10VDC or 4-20mA |
| 2 | I, 10V or 4-20mA Select | 0-5VDC | 0-10VDC or 4-20mA |
| 3 | OVP, 10V Select | 0-5VDC | 0-10VDC |
| 4 | VMON, 10V Select | 0-5VDC or 4-20mA | 0-10VDC |
| 5 | IMON, 10V Select | 0-5VDC or 4-20mA | 0-10VDC |
| 6 | EXT-OFF, Active-Low Select | Active-High Logic Level | Active-Low Logic Level |
| 7 | LCK-OUT | Enable Front Panel Controls | Lockout Front Panel |
| 8 | Not Used | — | — |

***Table 2–1. INTFC SETUP Switch***

### 2.1.1 INTFC SETUP Switch Functions

The following sections describe the functions of the various switch positions:

**V, 10V or 4-20mA Select:** Position-1, when ON, selects 0-10VDC programming of the output voltage. Also, must be set to ON position when the ISOLATED ANALOG INTERFACE connector is wired for 4-20mA output voltage programming. When OFF, selects 0-5VDC programming of the output voltage.

**I, 10V or 4-20mA Select:** Position-2, when ON, selects 0-10VDC programming of the output current. Also, must be set to ON position when the ISOLATED ANALOG INTERFACE connector is wired for 4-20mA output current programming. When OFF, selects 0-5VDC programming of the output current.

**OVP, 10V Select:** Position-3, when ON, selects 0-10VDC programming of OVP threshold. When OFF, selects 0-5VDC programming of OVP threshold.

**VMON, 10V Select:** Position-4, when ON, selects 0-10VDC range for readback of output voltage. When OFF, selects 0-5VDC readback of output voltage. Also, must be set to OFF position when the ISOLATED ANALOG INTERFACE connector is wired for 4-20mA output voltage readback.

**IMON, 10V Select:** Position-5, when ON, selects 0-10VDC range for readback of output current. When OFF, selects 0-5VDC readback of output current. Also, must be set to OFF position when the ISOLATED ANALOG INTERFACE connector is wired for 4-20mA output current readback.

**EXT-OFF, Active-Low Select:** Position-6, when ON, selects the ACTIVE-LOW logic level for disabling the output with the EXTERNAL-OFF signal of the ISOLATED ANALOG INTERFACE connector. When OFF, selects the ACTIVE-HIGH logic level for disabling the output with the EXTERNAL-OFF signal of the Isolated Analog Interface connector.

**LCK-OUT:** Position-7, when ON, disables the front panel controls; the front panel LOCAL(REMOTE) switch will not toggle between the front panel and remote control.

**Position-8:** Not used

## 2.2 SETUP Switch

Only two positions of the SETUP switch remain functional: Position-1, REM SNS, for remote sensing selection; Position-2, SLAVE, for master/slave selection. Their operation is the same as presented in the Operation Manual. The other switch positions, Position-3 through Position-8, are not used.

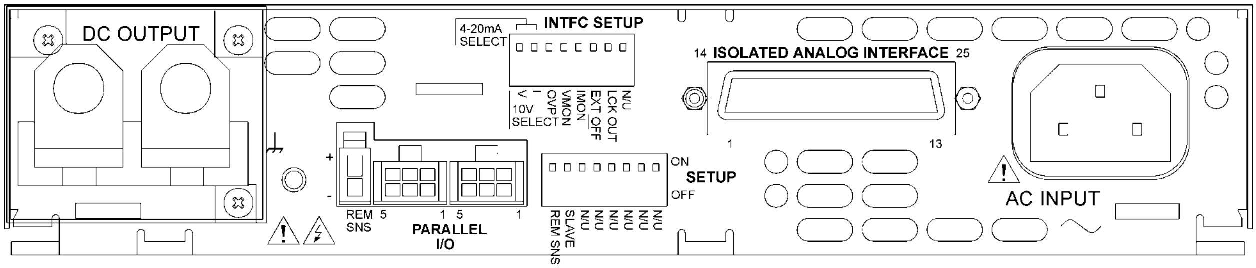



*Figure 2–1. Rear Panel View, Low–Voltage Models*

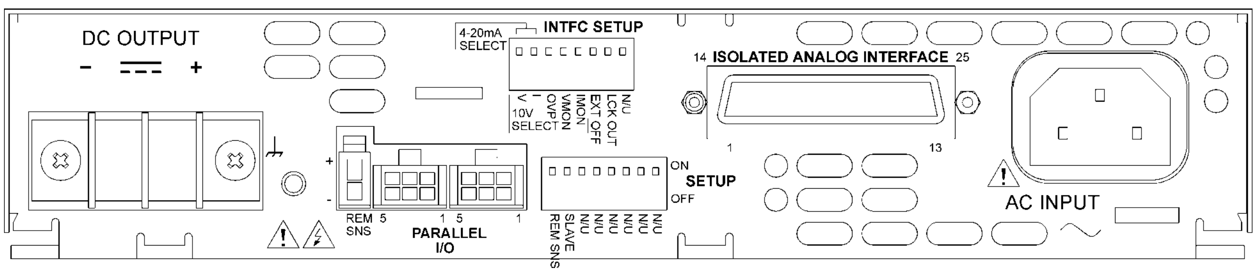



*Figure 2–2. Rear Panel View, High–Voltage Models*

## 2.3 Isolated Analog Interface Connector

The ISOLATED ANALOG INTERFACE connector is a 25-position female Subminiature-D type.

| Pin | Function |
|---|---|
| 1 | ANALOG-CONTROL input |
| 2 | Return for 0-5/10V monitor outputs and EXTERNAL-OFF |
| 3 | OVP programming input |
| 4 | Voltage monitor output, 4-20mA |
| 5 | VOLTAGE-MODE status output |
| 6 | Return for 4-20mA monitor outputs, Auxiliary 5VDC, and digital I/O |
| 7 | Current monitor output, 0-5/10V |
| 8 | 1.25VDC output for 4-20mA voltage programming signal |
| 9 | Voltage programming input |
| 10 | Current programming input |
| 11 | 1.25VDC output for 4-20mA current programming signal |
| 12 | Return for 0-5/10V or resistance programming signals |
| 13 | Return for 4-20mA current programming signal |
| 14 | EXTERNAL-OFF input |
| 15 | Auxiliary 5VDC output (+) |
| 16 | OVP resistance programming output, 1mA source |
| 17 | OVP status output |
| 18 | FAULT status output |
| 19 | Voltage monitor output, 0-5/10V |
| 20 | 1.25V input for 4-20mA voltage programming signal |
| 21 | Voltage resistance programming output, 1mA source |
| 22 | Current resistance programming output, 1mA source |
| 23 | 1.25V input for 4-20mA current programming signal |
| 24 | Current monitor output, 4-20mA |
| 25 | Return for 4-20mA voltage programming |

***Table 2–2. ISOLATED ANALOG INTERFACE Connector Pinout***

CAUTION

*The signals of the ISOLATED ANALOG INTERFACE have an internal connection to chassis ground. Damage could result if the voltage from signal returns, Pin-2, 6, 12, 13, and 25, to chassis ground exceeds 15VDC.*

### 2.3.1 ISOLATED ANALOG INTERFACE Functions

The following sections describe the functions of the various signals of the ISOLATED ANALOG INTERFACE. Pin numbers correspond to the connector pinout of Table 2–2.

**Digital Control Input Signals**

**ANALOG-CONTROL:** Pin-1, enables remote analog programming with an active-high logic level of 3-15VDC. An internal 100kΩ pull-down resistor is provided. When ANALOG-CONTROL is asserted, the power supply will power-up with the analog interface in control of the output voltage. Signal is referenced to Pin-6. Circuit is SELV, and has electrical isolation from the output of the unit.

**EXTERNAL-OFF:** Pin-14, disables the output when asserted. Active logic level could be selected with the INTFC SETUP switch to be high (3-30VDC) or low. An internal 100kΩ pull-down resistor is provided. Signal is referenced to Pin-2. Circuit is SELV, and has electrical isolation from the output of the unit.

**Digital Control Output Signals**

**VOLTAGE-MODE:** Pin-5, nominal 5VDC logic level indicates operation in constant-voltage mode. Source resistance is 2kΩ. Signal is referenced to Pin-6. Circuit is SELV, and has electrical isolation from the output of the unit.

**OVP:** Pin-17, nominal 5VDC logic level indicates that the output has been disabled because of overvoltage protection. Source resistance is 2kΩ. Signal is referenced to Pin-6. Circuit is SELV, and has electrical isolation from the output of the unit.

**FAULT:** Pin-18, nominal 5VDC logic level indicates that the output is disabled because of overtemperature or summary fault. Source resistance is 2kΩ. Signal is referenced to Pin-6. Circuit is SELV, and has electrical isolation from the output of the unit.

**Analog Monitor Signals**

**VOLTAGE MONITOR, 0-5/10V:** Pin-19, readback of the output voltage is provided with a 0-5VDC or 0-10VDC signal (user selectable with INTFC SETUP switch) indicating 0-100% of full scale output. Signal is referenced to Pin-2. Circuit is SELV, and has electrical isolation from the output of the unit.

**VOLTAGE MONITOR, 4-20mA:** Pin-4, readback of the output voltage is provided with a 4-20mA signal indicating 0-100% of full scale output. Signal return for the 4-20mA current is Pin-6. Circuit is SELV, and has electrical isolation from the output of the unit.

**CURRENT MONITOR, 0-5/10V:** Pin-7, readback of the output current is provided with a 0-5VDC or 0-10VDC signal (user selectable with INTFC SETUP switch) indicating 0-100% of full scale output. Signal is referenced to Pin-2. Circuit is SELV, and has electrical isolation from the output of the unit.

**CURRENT MONITOR, 4-20mA:** Pin-24, readback of the output current is provided with a 4-20mA signal indicating 0-100% of full scale output. Signal return for the 4-20mA current is Pin-6. Circuit is SELV, and has electrical isolation from the output of the unit.

## Analog Programming Signals

**OVP PROGRAMMING INPUT:** Pin-3, an input signal of 0-5 volts or 0-10 volts (user selectable with INTFC SETUP switch) programs the OVP threshold from 5-110% of full scale output voltage. Signal is referenced to Pin-12. Circuit is SELV, and has electrical isolation from the output of the unit.

**VOLTAGE PROGRAMMING INPUT:** Pin-9, an input signal for two methods of programming the output voltage: 0-5/10V voltage source or 4-20mA current source.

An input signal of 0-5VDC or 0-10VDC (user selectable with INTFC SETUP switch) to Pin-9 programs the output voltage 0-100% of full scale. Signal is referenced to Pin-12.

An input signal of 4-20mA (user selectable with INTFC SETUP switch) to Pin-9 programs the output voltage 0-100% of full scale. Two jumpers are also required:

Pin-20 to Pin-8; Pin-25 to Pin-12. Signal return for the 4-20mA current is Pin-25; resultant burden voltage is referenced to Pin-12.

Circuits are SELV, and have electrical isolation from the output of the unit.

**CURRENT PROGRAMMING INPUT:** Pin-10, an input signal for two methods of programming the output current: 0-5/10V voltage source or 4-20mA current source.

An input signal of 0-5VDC or 0-10VDC (user selectable with INTFC SETUP switch) to Pin-10 programs the output current 0-100% of full scale. Signal is referenced to Pin-12.

An input signal of 4-20mA (user selectable with INTFC SETUP switch) to Pin-10 programs the output current 0-100% of full scale. Two jumpers are also required:

Pin-23 to Pin-11; Pin-13 to Pin-12. Signal return for the 4-20mA current is Pin-13; resultant burden voltage is referenced to Pin-12.

Circuits are SELV, and have electrical isolation from the output of the unit.

**OVP RESISTANCE PROGRAMMING OUTPUT:** Pin-16 provides a 1mA current source which would be connected to Pin-3, OVP PROGRAMMING INPUT, with a 0-5kΩ external resistor connected between Pin-16 to Pin-12, to program the OVP threshold from 5-110% of full scale output voltage. The INTFC SETUP switch Position-3, OVP, must be set to OFF (down) to select 0-5VDC input range. Circuit is SELV, and has electrical isolation from the output of the unit.

**VOLTAGE RESISTANCE PROGRAMMING OUTPUT:** Pin-21 provides a 1mA current source which would be connected to Pin-9, VOLTAGE PROGRAMMING INPUT, with a 0-5kΩ external resistor connected between Pin-21 to Pin-12, to program the output voltage from 0-100% of full scale output. The INTFC SETUP switch Position-1, V, must be set to OFF (down) to select 0-5VDC input range. Circuit is SELV, and has electrical isolation from the output of the unit.

**CURRENT RESISTANCE PROGRAMMING OUTPUT:** Pin-22 provides a 1mA current source which would be connected to Pin-10, CURRENT PROGRAMMING INPUT, with a 0-5kΩ external resistor connected between Pin-22 to Pin-12, to program the output current from 0-100% of full scale output. The INTFC SETUP switch Position-2, I, must be set to OFF (down) to select 0-5VDC input range. Circuit is SELV, and has electrical isolation from the output of the unit.

**Auxiliary Sources**

**AUXILIARY 5VDC OUTPUT:** Pin-15, 5VDC source output for use with logic and programming circuits. Source capability is adequate to provide for full scale programming of output voltage, current, or OVP when the user connects it to the appropriate programming input(s). Source is referenced to Pin-6. Maximum output current is 15mA. Circuit is SELV, and has electrical isolation from the output of the unit.

**AUXILIARY 5VDC RETURN:** Pin-6, return of 5VDC AUXILIARY source output. Circuit is SELV, and has electrical isolation from the output of the unit.

**1.25VDC REFERENCE FOR 4-20mA VOLTAGE PROGRAMMING:** Pin-20, provides a 1.25VDC reference utilized by internal circuits associated with 4-20mA programming of output voltage.

**1.25VDC REFERENCE FOR 4-20mA CURRENT PROGRAMMING:** Pin-11, provides a 1.25VDC reference utilized by internal circuits associated with 4-20mA programming of output current.

## 2.4 Remote Programming Configuration

Table 2–3 presents the options for remote control operation. Pin numbers refer to the ISOLATED ANALOG INTERFACE connector. Switch position numbers refer to the INTFC SETUP switch on the rear panel.

| Mode of Operation | ANALOG-CONTROL Signal, Pin-1 | LCK-OUT, INTFC Setup Switch Position-7 | Power-Up State | Local/Remote Toggling |
|---|---|---|---|---|
| Remote Only | High Level | ON (Up) | Remote | No |
| Local Only | Low or Open | Off (Down) | Local | No |
| Local/Remote | High Level | OFF (Down) | Remote | Yes |

***Table 2–3. Remote Programming Configuration Options***

### 2.4.1 Voltage Source Programming of Output Voltage

Setting up for voltage source programming of the output voltage is as follows:

1. Set Position-1, V, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.

2. Set Position-1, V, of the INTFC SETUP switch ON (up) for 0-10VDC programming range.

3. Connect the external programming voltage source to the ISOLATED ANALOG INTERFACE connector, with positive to Pin-9 and negative to Pin-12.

4. Program the other parameters to the desired limit values: CURRENT PROGRAMMING INPUT, Pin-10, and the OVP PROGRAMMING INPUT, Pin-3, with respect to pin-12.

5. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

### 2.4.2 Voltage Source Programming of Output Current

Setting up for voltage source programming of the output current is as follows:

1. Set Position-2, I, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.

2. Set Position-2, I, of the INTFC SETUP switch ON (up) for 0-10VDC programming range.

3. Connect the external programming voltage source to the ISOLATED ANALOG INTERFACE connector, with positive to Pin-10 and negative to Pin-12.

4. Program the other parameters to the desired limit values: VOLTAGE PROGRAMMING INPUT, Pin-10, and the OVP PROGRAMMING INPUT, Pin-3, with respect to pin-12.

5. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

### 2.4.3 Voltage Source Programming of OVP

Setting up for voltage source programming of OVP is as follows:

1. Set Position-3, OVP, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.
2. Set Position-3, OVP, of the INTFC SETUP switch ON (up) for 0-10VDC programming range.

3. Connect the external programming voltage source to the ISOLATED ANALOG INTERFACE connector, with positive to Pin-3 and negative to Pin-12.

4. Program the other parameters to the desired limit values: VOLTAGE PROGRAMMING INPUT, Pin-9, and the CURRENT PROGRAMMING INPUT, Pin-10, with respect to Pin-12.

5. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

### 2.4.4 Resistance Programming of Output Voltage

Setting up for resistance programming of the output voltage is as follows:

1. Set Position-1, V, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.

2. Connect the external programming resistance, 0-5kΩ, to the ISOLATED ANALOG INTERFACE connector, from Pin-21 to Pin-12.

3. Connect a jumper from Pin-21 to Pin-9.

4. Program the other parameters to the desired limit values: CURRENT PROGRAMMING INPUT, Pin-10, and the OVP PROGRAMMING INPUT, Pin-3, with respect to Pin-12.

5. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

### 2.4.5 Resistance Programming of Output Current

Setting up for resistance programming of the output current is as follows:

1. Set Position-2, I, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.

2. Connect the external programming resistance, 0-5kΩ, to the ISOLATED ANALOG INTERFACE connector, from Pin-22 to Pin-12.

3. Connect a jumper from Pin-22 to Pin-10.

4. Program the other parameters to the desired limit values: VOLTAGE PROGRAMMING INPUT, Pin-9, and the OVP PROGRAMMING INPUT, Pin-3, with respect to Pin-12.
5. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

### 2.4.6 Resistance Programming of OVP

Setting up for resistance programming OVP is as follows:

1. Set Position-3, OVP, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.

2. Connect the external programming resistance, 0-5kΩ, to the ISOLATED ANALOG INTERFACE connector, from Pin-16 to Pin-12.

3. Connect a jumper from Pin-16 to Pin-3.

4. Program the other parameters to the desired limit values: VOLTAGE PROGRAMMING INPUT, Pin-9, and the CURRENT PROGRAMMING INPUT, Pin-10, with respect to pin-12.

5. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

### 2.4.7 4-20mA Current Source Programming of Output Voltage

Setting up for 4-20mA programming of the output voltage is as follows:

1. Set Position-1, V, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.

2. Connect the external 4-20mA programming current source to the ISOLATED ANALOG INTERFACE connector, with source at Pin-9 and return at Pin-25.

3. Connect a jumper from Pin-25 to Pin-12.

4. Connect a jumper from Pin-8 to Pin-20.

5. Program the other parameters to the desired limit values: CURRENT PROGRAMMING INPUT, Pin-10, and the OVP PROGRAMMING INPUT, Pin-3, with respect to pin-12.

6. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

### 2.4.8 4-20mA Current Source Programming of Output Current

Setting up for 4-20mA programming of the output current is as follows:

1. Set Position-2, I, of the INTFC SETUP switch to OFF (down) for 0-5VDC programming range.

2. Connect the external 4-20mA programming current source to the ISOLATED ANALOG INTERFACE connector, with source at Pin-10 and return at Pin-13.

3. Connect a jumper from Pin-13 to Pin-12.

4. Connect a jumper from Pin-11 to Pin-23.

5. Program the other parameters to the desired limit values: VOLTAGE PROGRAMMING INPUT, Pin-9, and the OVP PROGRAMMING INPUT, Pin-3, with respect to pin-12.

6. Connect Pin-1, ANALOG-CONTROL, of the ISOLATED ANALOG INTERFACE connector to Pin-15.

## 2.5 EXTERNAL-OFF Control

The EXTERNAL-OFF control input provides the same functionality as the OUTPUT switch on the front panel. When asserted, it will turn off the output converter, discharge the output capacitors with the downprogrammer, and reset the OVP and FAULT monitors. The signal could be configured to be either active-low or active-high with the INTFC SETUP switch on the rear panel.

Set Position-6, /EXT-OFF, to the OFF (down) position to select the active-high logic level for asserting EXTERNAL-OFF. Set Position-6, /EXT-OFF, to the ON (up) position to select the active-low logic level for asserting EXTERNAL-OFF. The logic-high level could be produced with a voltage source within the range of 3-30VDC, and would be connected to Pin14, positive, and Pin-2, return. The circuit is SELV, and has electrical isolation from the output of the unit.

## 2.6 Remote Monitoring

Analog signals are available for monitoring the output voltage and current. These signals vary proportionally to the output parameters, and have user selectable ranges of 0-5VDC, 0-10VDC, or 4-20mA for an output change from zero to full scale. Refer to Table 2–4 for information on configuring the monitors.

| **Output Monitor Signal** | **ISOLATED ANALOG INTERFACE Connections** | | **INTFC SETUP Switch** | | **Signal Range** |
|---|---|---|---|---|---|
| | **Signal** | **Return** | **Position** | **Setting** | |
| Voltage | Pin-19 | Pin-2 | 4, VMON | OFF (down) | 0-5VDC |
| Voltage | Pin-19 | Pin-2 | 4, VMON | ON (up) | 0-10VDC |
| Voltage | Pin-4 | Pin-6 | 4, VMON | OFF (down) | 4-20mA |
| Current | Pin-7 | Pin-2 | 5, IMON | OFF (down) | 0-5VDC |
| Current | Pin-7 | Pin-2 | 5, IMON | ON (up) | 0-10VDC |
| Current | Pin-24 | Pin-6 | 5, IMON | OFF (down) | 4-20mA |

***Table 2–4. Remote Monitoring***

## 2.7 Remote Digital Status Signals

Digital signals are available for remote monitoring the operational status of the unit. Refer to Table 2–5 for information on the characteristics of the signals.

| Status Indicator Signal | ISOLATED ANALOG INTERFACE Connections | | Logic Levels (with No Signal Output Current) | | Output Resistance |
|---|---|---|---|---|---|
| | Signal | Return | Asserted | Not Asserted | |
| VOLTAGE-MODE | Pin-5 | Pin-6 | 5V | 0V | 2kΩ |
| OVP | Pin-17 | Pin-6 | 5V | 0V | 2kΩ |
| FAULT | Pin-18 | Pin-6 | 5V | 0V | 2kΩ |

***Table 2–5. Remote Digital Status Signals***